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Supreme Court, U.S.
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IN THE

Supreme Court of the United States

OCTOBER TERM, 1993

ALEXANDER LOCE,

Petitioner,

- against -

THE STATE OF NEW JERSEY,

Respondent.

TINA KRAIL, ET ALS.,

Petitioners,

- against -

THE STATE OF NEW JERSEY,

Respondent.

BRIEF AMICUS CURIAE IN SUPPORT OF PETITIONS FOR CERTIORARI TO SUPREME COURT OF NEW JERSEY INTERNATIONAL RIGHT TO LIFE FEDERATION, ET ALS.

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COPY

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INTERNATIONAL RIGHT TO LIFE FEDERATION; WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE; ACT RIGHT TO LIFE ASSOCIATION; ACTION LIFE (OTTAWA) INC.; AMERICAN ACADEMY OF MEDICAL ETHICS; ASOCIACION EN DEFENSA DE LA VIDA HUMANA; ASSOCIACAO NACIONAL PRO-VIDA E PRO-FAMILIA; ASSOCIATION FOR TRAINING & EDUCATION IN NATURAL FAMILY PLANNING; CANADIAN PHYSICIANS FOR LIFE; CENTER OF STUDY AND RESEARCH FOR NATURAL FERTILITY REGULATION OF THE CATHOLIC UNIVERSITY OF THE SACRED HEART; CHRISTDEMOKRATEN FUR DAS LEBEN; COLUMBAN SISTERS; DENTISTS FOR LIFE; DEPARTMENT OF GYNECOLOGY & OBSTETRICS OF THE CATHOLIC UNIVERSITY OF THE SACRED HEART; FACULTAD DE MEDICINA DE LA UNIVERSIDAD CATOLICA DE CHILE; FAMILY LIFE SOCIETY; FOUNDATION GENESIS; GRUPO DE INVESTIGACION EN BIOETICA DE GALICIA; HOPE (TEACHING) HEALTH CLINIC FAMILY LIFE AND NATURAL FAMILY LIFE CENTRE; HOSPITAL CHRISTIAN FELLOWSHIP, INC.; INDIAN SOCIETY FOR NATURAL FAMILY PLANNING; INSTITUTE OF MEDICAL ANTHROPOLOGY & BIOETHICS; INSTITUTE ON PUBLIC ISSUES RELATING TO HEALTH CARE AND MEDICINE; LIFE ISSUES INSTITUTE, INC.; LITHUANIAN ASSOCIATION OF WFDRHL; LIVSRETT OG MENNESKEVERD; NATIONAL ASSOCIATION OF OVULATION METHOD INSTRUCTORS; NATIONAL ASSOCIATION OF PRO-LIFE NURSES; NATIONAL COMMISSION ON HUMAN LIFE, REPRODUCTION & RHYTHM; NATIONAL FEDERATION OF CATHOLIC PHYSICIANS' GUILDS; NEDERLANDS ARTSENVERBOND; NORSK PRO VITA; PHARMACISTS FOR LIFE; PHARMACISTS WHO RESPECT HUMAN LIFE (NSW) AUSTRALIA; PHILADELPHIA CATHOLIC PHYSICIANS GUILD; PHILIPPINE ASSOCIATION OF FAMILY PHYSICIANS IN AMERICA; PHYSICIANS FOR LIFE-ALBERTA DIVISION; PRO LIFE FOUNDATION, HUNGARY; PRO LIFE VICTORIA INC.; PROFESSOR DOCTOR G. A. LINDEBOOM INSTITUTE CENTRE FOR MEDICAL ETHICS; RIGHT TO LIFE ASSOCIATION OF TORONTO AND AREA; SCIENTISTS FOR LIFE; ST. COLUMBAN'S CLINIC; THE CATHOLIC MEDICAL GUILD OF SINGAPORE; THE DIETRICH BONHOEFFER INTERNATIONAL INSTITUTE FOR BIOETHICAL STUDIES INC.; THE GUILD OF ST. LUKE, S.S. COSMAS & DAMIAN; THE HUMAN LIFE FOUNDATION; THE INTERNATIONAL SOCIETY OF PRENATAL AND PERINATAL PSYCHOLOGY AND MEDICINE; THE MEDICAL EDUCATION TRUST; NEW ZEALAND DOCTORS FOR LIFE; WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE-AUSTRALIAN BRANCH; WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE-BRITISH SECTION; WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE SOUTH AFRICA; WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE-UNITED STATES BRANCH; WORLD ORGANIZATION OF THE OVULATION METHOD-BILLINGS.

TABLE OF CONTENTS

TABLE OF AUTHORITIES iii

INTERESTS OF AMICI 1

SUMMARY OF ARGUMENT 11

ARGUMENT 12

I. THE LIFE OF A CHILD BEGINS AT CONCEPTION. SIGNIFICANT SCIENTIFIC DISCOVERIES SINCE *ROE V. WADE* SUPPORT THIS CONCLUSION. THERE NOW EXISTS A CONSENSUS IN SCIENCE AND MEDICINE CONCERNING THE FACTS WHICH FORM THE BASIS FOR THIS CONCLUSION. THIS COURT SHOULD GRANT THE WRIT TO DECIDE WHEN LIFE BEGINS AND THE RIGHTS OF THE CHILD. . 12

A. Introduction 12

B. The Life of Each Person Begins at Conception. 15

II. BASED ON NEW SCIENTIFIC AND MEDICAL INFORMATION A CHILD EXPERIENCES PAIN DURING ABORTION EVEN AS EARLY AS EIGHT WEEKS AFTER CONCEPTION. 28

A. The New Technology. 28

B. Assumptions About Pain. 31

C. The Need to Relieve Pain During Fetal Surgery. 34

D. Non-Myelinated Nerve Fibers Transmit Pain. 36

E. It is Now Known that Full Cortical Development Is Not Necessary for the Child to Experience and Respond to Pain Prior to Birth. 37

CONCLUSION 45

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INTERESTS OF AMICI

Each amicus curiae in support of the Petitions for Certiorari has an interest in this case because each exists and acts for the purpose of achieving the recognition and protection of all human beings, whether born or unborn. Many amici are medical, scientific or bio-ethical organizations and all have concluded, and new scientific evidence supports the conclusion, that the unborn child prior to birth is a full, complete and separate human being. The amici curiae who appear in support of the Petitions for Certiorari are: INTERNATIONAL RIGHT TO LIFE FEDERATION ["IRTLF"][1]; WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE ["WFDRHL"][2];

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[1]IRTLF is an international educational group organized 10 years ago, with its main office in Rome, Italy. IRTLF's main function is to promote education and communication between the various national right to life groups throughout the world. It sponsors two to four international educational congresses annually and has Non-Governmental Organization status in the U.N. and is regularly represented in Geneva, Switzerland on issues pertaining to respect for human life.

[2]This worldwide federation has a membership of 350,000 physicians from 65 nations. It has a constituent membership of 75 groups worldwide. WFDRHL is headquartered in Ostend, Belgium. Its members adhere to the principles that, from the moment of conception, a human being is alive and entirely distinct from the mother who provides nourishment and protection; that each human being is unique and irreplaceable; and that medicine must

ACT RIGHT TO LIFE ASSOCIATION ["ACT"][3]; ACTION LIFE (OTTAWA) INC. ["ALO"][4]; AMERICAN ACADEMY OF MEDICAL ETHICS ["AAME"][5]; ASOCIACION EN DEFENSA DE LA VIDA HUMANA ["ADVH"][6] ASSOCIACAO NACIONAL PRO-VIDA E PRO-FAMILIA ["ANPV"][7]; ASSOCIATION FOR TRAINING & EDUCATION IN NATURAL FAMILY PLANNING ["ATEN"][8]; CANADIAN

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have absolute respect for human life regardless of age, illness, disability or degree of dependence.

[3]ACT is located in Canberra, Australia, and has a membership of 350. It engages in political and educational activities for the protection of human life from conception to natural death.

[4]ALO, formed in 1971 in Ottawa, has 4,000 members and seeks to develop respect for all human life from conception until natural death, through education, publicity and public meetings.

[5]AAME, incorporated in Indiana in 1986, has 22,000 member physicians in all specialties from the U.S. and Canada. It is dedicated to the sanctity and defense of human life from conception until natural death and seeks to return medicine to the original principles of the Hippocratic Oath.

[6]ADVH has 305 members and is located in Seville, Spain. Formed in 1983, its purpose is to oppose abortion in the world and in Spain particularly.

[7]ANPV is headquartered in Brasilia, Brazil and acts to exchange information with similar organizations in Brazil and elsewhere about defending the family and life (from conception).

[8]ATEN is a speakers bureau in Ohio which conducts educational programs in the fields of natural family planning and applied sciences. ATEN believes all human beings are entitled to protection from conception onward.

PHYSICIANS FOR LIFE ["CPL"][9]; CENTER OF STUDY AND RESEARCH FOR NATURAL FERTILITY REGULATION OF THE CATHOLIC UNIVERSITY OF THE SACRED HEART ["CSR"][10]; CHRISTDEMOKRATEN FUR DAS LEBEN ["CDL"][11]; COLUMBAN SISTERS ["CS"][12]; DENTISTS FOR LIFE ["DFL"][13]; DEPARTMENT OF GYNECOLOGY & OBSTETRICS OF THE CATHOLIC UNIVERSITY OF THE SACRED HEART ["DGO"][14];

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[9]CPL, is a Canadian corporation with offices in Ontario, whose membership of about 1,000 physicians from across Canada, believes in the sanctity and defense of human life begining at conception.

[10]CSR, located at the Catholic University of the Sacred Heart in Rome, Italy, works for the defense of human life and to achieve respect for human life beginning at conception.

[11]CDL is an association of politicians, scientists, journalists and educators from throughout Europe who organize discussions and provide political input to achieve the recognition of absolute values, including the inviolability of human life from conception until natural death.

[12]CS, consisting of four members of the Order, and organized in Mokpo, Korea in 1956, works for the marginalized in society to promote the dignity of all human beings.

[13]DFL was organized in 1988 in Pennsylvania to foster the sanctity and defense of human life from conception on and DFL is committed to the application of medical and technological skills in support of this principle.

[14]Located in Rome, Italy, DGO's members (including 38 professional staff, 55 residents and fellows and 40 midwives) provide medical assistance, research and training in gynecology and obstetrics and recognize that the life of the human being begins at conception.

FACULTAD DE MEDICINA DE LA UNIVERSIDAD CATOLICA DE CHILE ["FDM"][15]; FAMILY LIFE SOCIETY ["FLS"][16]; FOUNDATION GENESIS ["FG"][17]; GRUPO DE INVESTIGACION EN BIOETICA DE GALICIA ["GIB"][18]; HOPE (TEACHING) HEALTH CLINIC FAMILY LIFE AND NATURAL FAMILY LIFE CENTRE ["HOPE"][19]; INDIAN SOCIETY FOR NATURAL FAMILY PLANNING ["ISNFP"][20]; INSTITUTE OF

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[15]Located in Santiago, Chile, the bio-ethics unit of FDM was formed in 1988 and consists of nine physicians who teach, research and consult in matters of bio-ethics. FDM is dedicated to defend human life from conception until natural death.

[16]Organized in the Republic of Singapore, FLS acts to promote respect for human life at all stages according to the teachings of the Catholic Church. It counsels those in pregnancy crisis.

[17]FG is located in Sydney, Australia and has 1,000 members who disseminate educational and research materials and conduct seminars and lectures on bioethical issues. Its members are mostly medical, legal and clerical professionals.

[18]GIB's membership of 74 academicians, physicians and judges derives from Galicia, Spain. It studies and distributes information especially regarding the respect and dignity of all humans from conception until natural death.

[19]HOPE, which is located in Jamaica, provides educational and emergency medical and dental services to the poor of the Montego Bay area, including pre-natal and post-natal care.

[20]ISNFP was formed in Madras, India, to teach natural family planning and respect for human life. It is non-denominational and services all.

MEDICAL ANTHROPOLOGY & BIOETHICS ["IMAB"][21]; INSTITUTE ON PUBLIC ISSUES RELATING TO HEALTH CARE AND MEDICINE ["IPI"][22]; LIFE ISSUES INSTITUTE, INC. ["LII"][23]; LITHUANIAN ASSOCIATION OF WFDRHL ["LA"][24]; LIVSRETT OG MENNESKEVERD ["LOM"][25]; NATIONAL ASSOCIATION OF OVULATION METHOD INSTRUCTORS ["NAOMI"][26]; NATIONAL ASSOCIATION OF PRO-LIFE NURSES

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[21]IMAB is an international organization of scientists, located in Vienna, Austria, which performs medical and ethics research and publishes books and articles on bioethics issues.

[22]IPI is headquartered in Hirosaki, Japan and has 316 members, including doctors, nurses, ethicists, journalists and lawyers. It conducts interdisciplinary international studies and discussions on health care problems from the viewpoints of sociology, philosophy and ethics.

[23]LII is an educational foundation whose goals include developing a broad-based national effort to stimulate and guide a renewal of pro-life education throughout the U.S. Its seeks to assure equal protection for all human beings from conception until natural death.

[24]Located in Vilnius, Lithuania, LA consists of 207 mostly physicians seeking to achieve legal protection of human life beginning at conception.

[25]Located in Oslo, this 12,500 member organization seeks to change public opinion on abortion. Its efforts, including publishing and lectures are directed toward schools, universities, churches and society in general.

[26]NAOMI is located in London, England. Its 164 instructors in the United Kingdom and Republic of Ireland train instructors in the Billings Ovulation Method. NAOMI is opposed to abortion and abortifacient methods of family planning.

["NAPLN"][27]; NATIONAL COMMISSION ON HUMAN LIFE, REPRODUCTION & RHYTHM ["NCHL"][28]; NATIONAL FEDERATION OF CATHOLIC PHYSICIANS' GUILDS ["NFCPG"][29]; NEDERLANDS ARTSENVERBOND ["NA"][30]; NORSK PRO VITA ["NPV"][31];

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[27]NAPLN was organized in 1973 and has about 1,000 members from across the U.S. It is dedicated to the sanctity of human life from conception until natural death and works to unite nurses who seek to achieve excellence in nurturing and caring for the unborn, newborn, the ill and dying.

[28]NCHL, a group of 120 physicians and educators, headquartered in Oak Park, Florida, publishes the "Child and Family Quarterly" and educates people on values in human and family life and reproduction.

[29]NFCPG is a federation headquartered in Elm Grove, Wisconsin, comprised of Catholic Physicians Guilds from across the U.S., with a membership of about 6,000 physicians. Among NFCPG's purposes is to provide leadership based on its knowledge, skill and experience in medicine. It believes that scientific evidence today clearly supports the view that the life of the individual begins at conception.

[30]Located in Leiden, The Netherlands, NA is an organization of 800 Dutch physicians who work to inform the public, doctors, the media and Parliament of the personhood of the unborn child and the need to uphold the Hippocratic Oath by protecting the unborn and terminally ill.

[31]The oldest pro-life movement in Norway, NPV's 2,500 members work to protect human life from conception until natural death by the disseminating adequate and thorough information.

PHARMACISTS FOR LIFE ["PFL"][32]; PHARMACISTS WHO RESPECT HUMAN LIFE (NSW) AUSTRALIA ["PWRHL"][33]; PHILADELPHIA CATHOLIC PHYSICIANS GUILD ["PCPG"][34]; PHILIPPINE ASSOCIATION OF FAMILY PHYSICIANS IN AMERICA ["PAFPA"][35]; PHYSICIANS FOR LIFE-ALBERTA DIVISION ["PFLA"][36]; PRO LIFE FOUNDATION, HUNGARY

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[32]PFL was incorporated in Ohio in 1984 and has a membership of more than 1,000 pharmacists and scientists from across the United States and from every continent in the world. PFL supports the sanctity and defense of human life from the moment of conception until natural death.

[33]PWRHL, a group of 135 pharmacists from across Australia, believes that all human life is of equal worth, that it is inviolable and that every born and preborn person has a natural right to life.

[34]PCPG was organized more than 20 years ago in Philadelphia and is the largest Catholic physicians group in the country, with hundreds of members from the Delaware Valley area. It informs and assists the Philadelphia Archdiocese and gives aid and assistance to charitable groups and the homeless.

[35]PAFPA was incorporated in Michigan in 1990. It is comprised of 130 family physicians of Philippine descent from across the U.S. PAFPA promotes the practice of medicine by family physicians and is committed to the principle that human life begins at conception.

[36]PFLA, which is headquartered in Edmonton, Alberta, Canada, supports and promotes conferences and meetings intended to educate physicians and the public so as to achieve respect for human life from conception until natural death.

["PLFH"][37]; PRO LIFE VICTORIA INC. ["PLV"][38]; PROFESSOR DOCTOR G. A. LINDEBOOM INSTITUTE CENTRE FOR MEDICAL ETHICS ["PDGAL"][39]; RIGHT TO LIFE ASSOCIATION OF TORONTO AND AREA ["RTLTA"][40]; SCIENTISTS FOR LIFE ["SFL"][41];

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[37]PLFH was organized in Budapest in 1991, to spread scientific information about abortion and euthanasia through the media and lectures and courses for high school and college students. Its president is the Archbishop of Hungary.

[38]PLV is an organization of over 1,000 members in Melbourne, Australia, which acts to uphold and promote the intrinsic value of human life and the rights of unborn children from the time of conception. It sponsors a pregnancy support service and is active politically.

[39]PDGAL is a foundation, located in Ede, The Netherlands, and acts to further Christian medical ethics in health care through teaching, research and writing.

[40]Located in Toronto, Ontario, Canada, this group has 20,000 members who believe that the right to life is the basic human right on which all other rights depend; all human beings share this right before and after birth and society has a duty to protect it. RTLTA performs many educational activities and has a research and resource center that provides information on abortion, euthanasia and other life issues. It also provides counseling for pregnant women in distress.

[41]SFL was incorporated in Ohio in 1991, is comprised of persons with professional degrees in the sciences, including medicine and has a national membership of approximately 150. Its main purpose is to educate people and disseminate scientific information about life issues, including abortion.

ST. COLUMBAN'S CLINIC ["SCC"][42]; THE CATHOLIC MEDICAL GUILD OF SINGAPORE ["CMGS"][43]; THE DIETRICH BONHOEFFER INTERNATIONAL INSTITUTE FOR BIOETHICAL STUDIES INC. ["DBI"][44]; THE GUILD OF ST. LUKE, S.S. COSMAS & DAMIAN ["GSL"][45]; THE HUMAN LIFE FOUNDATION ["HLF"][46]; THE INTERNATIONAL SOCIETY OF

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[42]SCC is located in Chun Chon City, Korea and is comprised of 30 medical professionals, social workers, catechist and missionary religious sisters who provide medical, social and educational services to all peoples. SCC believes that each human being is entitled to recognition and protection beginning from conception.

[43]This group of 270 doctors, dentists, dental surgeons and pharmacists located in Singapore organizes medical seminars and spiritual enrichment programs on pro-life and natural family planning matters.

[44]Located in Adelaide, Australia, DBI promotes the study of human life ethics by providing speakers from its membership of over 300. It makes sub-missions to government and has published booklets on bioethical issues.

[45]GSL is a guild of Catholic doctors, organized in Wellington, New Zealand, which seeks to promote the spiritual and intellectual welfare of Catholic Medical Practitioners, study and discuss medical problems, especially those of a moral, ethical, philosophical and spiritual nature and uphold the moral law in the practice of medicine.

[46]Located in New York City, HLF seeks to promote educational and charitable efforts in relation to the unborn's right to life. It publishes Human Life Review and provides assistance to women to have, and not abort, their children. Ten thou-sand contributors support the foundation.

PRENATAL AND PERINATAL PSYCHOLOGY AND MEDICINE ["ISPPPM"][47]; THE MEDICAL EDUCATION TRUST ["MET"][48]; NEW ZEALAND DOCTORS FOR LIFE ["NZDFL"][49]; WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE-AUSTRALIAN BRANCH ["WFDRHLAB"][50]; WORLD FEDERATION OF DOCTORS

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[47]ISPPPM, formed in Vienna in 1971, with its main office in Cracow, Poland, has a worldwide membership comprised of all types of medical specialists and includes educators, anthropologists, ehtnologists, philosophers and social economists. ISPPPM promotes research and education in the field of human development and edits the official journal, The International Journal of Prenatal and Perinatal Psychology and Medicine and organizes a world congress held every three years.

[48]MED is the Liverpool based charity arm of The World Federation of Doctors Who Respect Human Life-British Section (see fn. 53). Its purpose is to identify factors which contribute to the health and well-being of man and to promote research into factors pertaining to the quality of life. Its many publications include those pertaining to the health hazards to the mother of abortion.

[49]NZDFL was organized in 1981 by a group of physicians and aims to: practice and promote ethical medicine as described by the Declaration of Geneva of the World Medical Association 1948; educate the medical profession and society at large regarding professional responsibility towards humanity; further legal protection for all members of the human race, both born and unborn; and promote scientific, social and economic measures to facilitate the practice of ethical medicine.

[50]WFDRHLAB is headquartered in Sydney, Australia and its 500 members, all of whom are medical professionals, conduct seminars, petition legislators and issue press releases about the bio-ethical issues associated with human life as they

WHO RESPECT HUMAN LIFE-BRITISH SECTION ["WFDRHLBS"][51]; WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE SOUTH AFRICA ["WFDRHLSA"][52]; WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE-UNITED STATES BRANCH ["WFDRHLUS"][53]; WORLD ORGANIZATION OF THE OVULATION METHOD-BILLINGS ["WOOMB"][54].

SUMMARY OF ARGUMENT

A Writ of Certiorari should be granted in this case because the new scientific information obtained in the last ten years leaves no doubt that the unborn child is a

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seek to uphold respect for human life from conception until natural death in terms of the Geneva Declaration of 1947 and the Helsinki Declaration.

[51]Headquartered in Liverpool, WFDRHLBS is a group of 500 physicians from throughout the United Kingdom who witness to the Hippocratic tradition of medicine. It makes submissions to government bodies on ethical issues, including abortion.

[52]WFDRHLSA, which is located in Cape Town, consists of 450 medical professionals who strive to influence and give support to doctors regarding respect for human life at all stages of development until natural death.

[53]Located in Oak Park, Florida, WFDRHLUS works to protect human life from conception until natural death by educational and consultative means. It has a membership of 100 drawn from the entire U.S.

[54]This worldwide organization which was formed in Los Angeles in 1977, has its main office in Kew Vic Australia. WOOMB seeks to strengthen family life and to promote love of the child. In addition to many other activities, WOOMB conducts scientific research into human reproductive technology.

human being from the moment of conception. Scientific technology has revolutionized how mankind obtains knowledge about the unique identity, completeness and development of the child from conception to birth. What science has learned at the molecular level belies many of the assumptions made at the time of *Roe v. Wade*, 410 U.S. 113 (1973): it is now known that children experience pain during surgical abortions as early as eight weeks after conception. Old assumptions about when and how human beings first feel pain no longer apply. New advances require a determination that a child is a human being from conception and that abortion results in the child's painful death.

ARGUMENT

I. THE LIFE OF A CHILD BEGINS AT CONCEPTION. SIGNIFICANT SCIENTIFIC DISCOVERIES SINCE *ROE V. WADE* SUPPORT THIS CONCLUSION. THERE NOW EXISTS A CONSENSUS IN SCIENCE AND MEDICINE ABOUT THE FACTS WHICH FORM THE BASIS FOR THIS CONCLUSION. THIS COURT SHOULD GRANT THE WRIT TO DECIDE WHEN LIFE BEGINS AND THE RIGHTS OF THE CHILD.

A. Introduction

Since this Court's decision in *Roe v. Wade*, there has been an explosion in science and technology that has fundamentally altered science's ability to acquire knowledge about human development. Science can now investigate human development at the molecular level using

recombinant DNA technology[55] and monoclonal antibody technology.[56] Today we can learn what is occurring in human development even before we can see specific structures develop.[57] Scientists now look at a human's building blocks, the proteins and instructions that control the proteins, and view what develops, when it develops, at the molecular level. On a macroscopic level, the new technology of ultrasound and its application to the study of the child in utero permits the observation of the child and how he or she reacts to its environment. Advances in

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[55] Watson, J.D.; Tooze, J.; and Kurtz, D.T. *Recombinant DNA: A Short Course*. San Francisco: W.H. Freman, 1983.

[56] Campbell, A.M. "Monoclonal Antibody Technology" In *Laboratory Techniques and Biochemistry and Molecular Biology*, edited by R.H. Burdon and P.H. Van Knippenberg. Eisevier (Amsterdam), 1985. See also, Martinis, J.; David, G.S.; Bartholomew, R.M.; and Wang, R. "Novel Application of Monoclonal Antibodies." In *Basic Biology of New Development* In *Biotechnology* In *Basic Life Sciences* 25(1983): 129-154, at 129.

[57] By contrast, in 1973; most knowledge about human identity and development before birth was based on gross morphological observations, whereby a scientist would observe a physical structure such as the cerebral cortex or dendritic spines, and when the structure was not present, observe the result. Today we can learn what is occurring in human development before we see structures develop.

electroencephalography permit the early detection of brain wave activity in the fetus. The results of these advances underscore the ignorance that existed in 1973 concerning the child. We now know that incorrect assumptions were made about: the child's existence as a unique human being from conception; his or her development from conception to old age; and the child's ability to feel pain before birth.

The origin and extensive use of molecular biological techniques since 1973 have dramatically changed the way in which modern biology is conducted. By using DNA probe technology, combined with the southern hybridization technique, for example, scientists are able to detect the presence or absence of a specific genetic code or instruction in a sample of tissue. When DNA probe techniques are combined with polymerase chain reaction (PCR)[58] it is possible to identify the presence of specific genetic code material in a sample as small as

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[58] Arnheim, N.; and Levenson, C.H. 1990. "Polymerase Chain Reaction." *Chemical & Engineering News* (Oct. 1990): 36-47, at p. 36. White, T.J.; Arnheim, N.; and Erlich, H.A. "The Polymerase Chain Reaction." *Trends Genet* 5(1989): 185-189, at p. 185. Arnheim, N.; White, T.; and Rainey, W. "Application of PCR: "Organismal and Population Biology." *Bioscience* 40(1990):174-182, at p. 174.

one cell[59]. This technology can now determine genetic uniqueness, genetic diseases and permit the observation of human development at the molecular level. This is done by analyzing human genes.

B. The Life of Each Person Begins at Conception.

The life of a human being begins at conception when the sperm of the father penetrates the mother's ovum at which point all of the genetic material and information needed for the complete development of a human being is present. The information carried by the father encounters in the same recipient cell the information transmitted by the mother so that almost instantaneously a new constitution is spelled out in genetic terms and everything that is needed to be a human being is present immediately after conception.[60] If, however, the genetic

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[59] Holding, C.; and Monk, M. "Diagnosis of Beta-Thalassaemia by DNA Amplification in Single Blastomeres from Mouse Preimplantation Embryos." *Lancet* II (1989): 532-535. Handyside, A.H.; Pattinson, J.K.; Penketh, R.J.A.; Delhanty, J.D.A.; Winston, R.M.L.; and Toddenham, E.G.D. "Biopsy of Human Preimplantation Embryos and Sexing by DNA Amplification." *Lancet* I (1989):347-349.

[60] Gilbert, S.F., *Developmental Biology*, Sinauer Ass. Inc., 1985, p.32-37, 58-63; Lugo, J.O.; and Hershey, G.L. *Human Development: A Multi-*

Disciplinary Approach to the Psychology of Individual Growth. New York: Macmillan Publishing Co., Inc., 1974. "The growth of every human being begins with a special cell, the fertilized ovum. Although the diameter of the ovum is approximaely 1/175 of an inch and its weight is about one 20 millionth of an ounce, all the genetic potentialities for the complete development of a human being are contained within it. From this microscopically small cell, a baby composed of about 200 billion cells of different kinds will develop during the next nine months. This striking phenomenon of growth is common in all human beings." p. 242; Mussen, P.H.; Conger, J.J.; and Kagan, J. *Child Development and Personality* 5th ed. New York: Harper & Row, 1979. "The life of each individual begins when a sperm cell from the father penetrates the wall of an ovum, or egg, from the mother." p. 52. "Life begins at conception. But what of the forces that, throughout the individual's existence, will influence his or her development? When do they begin? The answer, again, is at conception. At the moment that the tiny tadpole-shaped sperm penetrates the wall of the ovum, it releases 23 minute particles called chromosomes. At approximately the same time, the nucleus, the inner core of the ovum, breaks up, releasing 23 chromosomes of its own." pp. 52-53. "This process is of great interest to us because it has been established through painstaking research that these chromosomes, which are further subdivided into even smaller particles called genes, are the carriers of the child's heredity. All the child's biological heritage from the father and mother is contained in these 46 chromosomes." p. 53. Thibodeau, G. *Anatomy and Physiology*. St. Louis: Times Mirror/Mosby College Publishing, 1987. "Half of the 46 chromosomes in the zygote nucleus have come from the sperm and half from the ovum. Since chromosomes are composed of genes, the new being inherits half of its genes and the characteristics they determine from its father and

information is insufficient, conception fails and no human being exists.[61] Not only is it

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half from its mother. Genetically, the zygote is complete. Time and nourishment are all that is needed for expression of those characteristics such as sex, body build, and skin color that were determined at fertlization." Thibodeau, G.A.; and Anthony, C.P. *Structure and Function of the Body* 8th ed. St. Louis: Times Mirror/Mosby College Publishers, 1988. "The science of the development of the individual before birth is called embryology. It is a story of miracles, describing the means by which a new human life is started and the steps by which a single microscopic cell is transformed into a complex human being." pp. 409-410. "Genetically the zygote is complete. It represents a new single celled individual." Moore K. *Before We Are Born*, 3rd ed. Philadelphia: WB Saunders Co. 1989. "Human development begins at fertlization when a male gamete or sperm fuses with a female gamete or ovum to form a zygote. The zygote is the first cell of a new human being." p. 25. The record in this case contains persuasive testimony by Dr. Jerome LeJeune on this and other points. His description of the genetic phenomena is of assistance to the Court in understanding the events and developments on this point (see, LeJeune test., Loce App. at A-115 to A-133; see also, the numerous authorities found following the Loce petition at A-19 to A-30.)

[61] Volpe, E.P., *Seeds of Life, In Biology and Human Concerns* (1983), Stout, J., 3rd Ed. Wm. C. Brown Co., p.18-20; Gilbert, S.F., *Developmental Biology*, Sinauer Ass. Inc., 1985, p.32-37, 58-63; Oppenheimer, S.B., et al. *Introduction to Embryonic Development*, 1989, Allyn and Bacon; Editorial Production Service, Lifland, et al. Bookmakers, p.20-60; Bernstein, R. et al. *Biology: The Study of Life* (1982), Harcorth, Brace, Jocvanovick, Inc. p. 584.

possible to identify the first cell following conception as being human, but the individual itself is identifiable.[62] There is no doubt that, immediately after conception, there

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[62] Moore, K. *Before We Are Born*, 3rd ed. Philadelphia W.B. Saunders Company 1989. "Fusion of the two haploid gametes or germ cells (each with 23 chromosomes) produce a zygote, which is a diploid cell with 46 chromosomes, the normal number for the human species." p. 26. Turner, J.S.; and Helms, D.B. Lifespan Developmental 2nd ed. CBS College Publishing (Hold, Rinehart, and Winston), 1983. "Yet far more remarkable than the birth itself is the process whereby a single fertilized egg develops into a fully functioning infant - complete with arms, legs, nose, eyes, ears, internal organs, and an individuality all of its own. The key to this magnificent story is a special code contained in the nucleus of a cell. This code, unique and different for every individual, is just now becoming understood by scientists." p. 52 "Each species of plant and animal and every individual within a species has a full set of directions locked inside its nucleus. This is what makes a mouse different from a bird, a flower different from a tree, and siblings different from each other." p. 52. Clark, J.; ed. *Genetics and Heredity: The Blueprints of Life*, In *The Human Body*. Torstar Books, Inc., 1985. "You are unique because the combination of your genes is unique, and nobody has exactly the same combination (even if you are an identical twin - although between such twins there are only subtle differences). Genes provide the fundamental information that determines how a person develops, although environment acts to shape the final product from the moment of conception onward."

exists a complete, separate, unique and identifiable human being.[63]

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[63] Moore, *supra*, 26-28; Volpe, *supra*, 18-20. Anthony C.P.; and Kolthoff, N.J. *Textbook of Anatomy and Physiology* 9th ed. St. Louis: the C.V. Mosby Company, 1975. Audesirk, G.; and Audesink, T. *Biology: Life on Earth*. 2nd ed. New York: Macmillian Publishing Company, 1989. Bernard, H.W. *Human Development in Western Culture* 4th ed. Boston: Allyn & Bacon, Inc., 1975. Bernstein, R. and Bernstein, S. *Biology: The Study of Life*. New York: Harcourt Brace Jovanovick, Inc., 1982. Bryant, N.J. *Disputed Paternity*. New York: Brian C. Decker, a Division of Thieme-Stratton, Inc., 1980. Clark, J. ed. *The Nervous System: Circuits of Communication In The Human Body*. Torstar Books, Inc., 1985. Clark, J.; ed. *Growth and Development: The Span of Life In The Human Body*. Torstar Books, Inc., 1985. Clark, J.; ed. *Genetics and Heredity: The Blueprints of Life*, In *The Human Body*. Torstar Books, Inc., 1985. Craig, G. *Human Development* 4th ed. Englewood Cliffs, NJ: Prentice-Hall, 1986. Crouch, J.E. *Functional Human Anatomy* 4th ed. Philadelphia: Lea & Febiger, 1985. DeCoursey, R.M. *The Human Organism* 4th ed. McGraw-Hill, Inc., 1974. Fitzgerald, H.E.; Strommen, E.A.; and McKinney, J.P. *Developmental Psychology: The Infant and Young Child*. Homewood, IL: The Dorsey Press, 1977. Gilbert, S.F. *Development Biology*. Sunderland, MA: Sinauer Associates, Inc., 1985. Goin, C.J.; and Goin, O.B. *Man and the Natural World* 2nd ed. New York: Macmillan Publishing Co., Inc., 1975. Goldenring, J.M. *Development of the Fetal Brain*. 307 The New England Journal of Medicine 564(1982). Harlock, E.B. *Child Development* 6th ed. McGraw-Hill, Inc., 1978. Jennett, S. *Human Physiology*. New York: Churchill Livingstone, 1989. Kaluger, G.; and Kaluger, M. *Human Development: The Span of Life*. St. Louis: Tne C.V. Mosby Company, 1974. Lugo, J.O.; and Hershey, G.L. *Human Development: A Multi-Disciplinary Approach to the Psychology of*

The genetic information needed to create a human being is created in DNA.[64] Methylation

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Individual Growth. New York: Macmillan Publishing Co., Inc., 1974. Mader, S.S. *Inquiry into Life*. Dobuque, Iowa: Wm. C. Brown Company Publishers, 1976. Moore, K. *Before We Are Born* 3rd ed. Philadelphia: W.B. Saunders Company, 1989. Munsinger, H. *Fundamentals of Child Development* 2nd ed. New York: Holt, Rinehart, and Winston, Inc., 1975. Mussen, P.H.; Conger, J.J.; and Kagan, J. *Child Development and Personality* 5th ed. New York: Harper & Row, 1979. Nelson, G.E. *Biological Principles with Human Applications* 3rd ed. New York: John Wiley & Sons, 1989. Parker, S. *Life Before Birth: The Story of the First Nine Months*. Cambridge: Cambridge University press, 1979. Pikunas, J. *Human Development: An Emergent Science*. McGraw-Hill, Inc., 1976. Scarr, S.; Weinberg, R.A.; and Levine A. *Understanding Development*. Harcourt Brace Jovanovich, Inc., 1986. Schuster, S.h.; and Asburn, S.S. *The Process of Human Development: A Holistic Life-Span Approach* 2nd ed. Boston: Little, Brown, and Company, 1986. Strand, F.L. *Physiology: A Regulatory Systems Approach*. New York: Macmillan Publishing Company, Inc., 1978. Sussman, L.N. *Paternity Testing By Blood Grouping*. Springfield, IL: Charles C. Thomas Publisher, 1976. Thibodeau, G.A.; and Anthony, C.P. *Structure and Function of the Body* 8th ed. St. Louis: Times Mirror/Mosby College Publishers, 1988. Thibodeau, G. *Anatomy and Physiology*. St. Louis: Times Mirror/Mosby College Publishing, 1987. Turner, J.S.; and Helms, D.B. *Lifespan Developmental* 2nd ed. CBS College Publishing (Hold, Rinehart, and Winston), 1983. Volpe, E.P. *Biology and Human Concerns* 3rd ed. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1983.

[64] Petitioners' genetics expert provides a useful description of this information: physically, it is analogous to the ribbon of tape that is used

of cytosine, discovered about five years ago, supports the conclusion that a human being is a complete person at conception. It was discovered that DNA contains basic information, like a program which instructs the specific development of the human being, with the result that some development is programmed to take place immediately and other

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in a tape recorder. Inside the head of a sperm is a long thread one meter or so in length and so tightly coiled in 23 little pieces that its entire volume can be put on the point of a needle. It contains 23 chromosomes; the ovum has the same number. The interaction of the biological components can be analogized to a tape recorder playing music. When a mini cassette, on which the music of an artist is recorded, is played, one experiences the sounds of a symphony. The tape, however, contains no notes or music or musicians. Because of a special code written on the tape, information will be conveyed in such a way that the tape recorder will read it and make air move through a loudspeaker. What is heard by the listener is not an orchestra, not musicians, not evidence of music, but the genius of the author. That is how life is played: inside the egg, which receives the tape band from the father, and which has its own tape band, there forms a sort of table or law of life. Within the egg there exists a tremendous amount of information to be received and interpreted. The genetic information necessary to form the completed human being is not only the long ribbon of DNA (which in the analogy is the mini cassette of the symphony), but the information in the cell itself, which reads it. The cell is analogous to the magnetiscope of the tape recorder and possesses within it enormous information.See, LeJeune test., Loce App. at A-118-119.

development later. Every single stage of growth, although programmed at conception, manifests itself as the program is read.[65] This is a significant new finding that science never anticipated at the time of *Roe*. It removes doubt about the nature and completeness of the human person at conception.

Other developments in technology have resulted in discoveries supporting the conclusion that a human being is genetically complete at the moment of conception.

In 1986, science discovered and developed a technique which can determine the identity of a human being. The technique, known as genetic fingerprinting, extracts DNA, examines it and records the unique traits of the individual.

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[65] Chaillet, J.R.; Vogt, T.F.; Beier, D.R.; and Leder, P. "Parental-Specific Methylation of an Imprinted Transgene is Established During Gamestogenesis and Progressively Changes During Embryogenesis." *Cell* 66(1991): 77-83. Surani, M.A.H.; Barton, S.C.; and Norris, M.L. "Nuclear Transplantation in the Mouse: Heritable Differences Between Paternal Genomes after Activation of the Embryotic Genome." *Cell* 45(1986): 127-136. Swain, J.L.; Stewart, T.A.; and Leder, P. "Parental Legacy Determines Methylation and Expression of a Cutosomal Transgene; A Molecular Mechanism for Paternal Imprinting." *Cell* 50(1987):719-727, at p. 719. Gilbert, S.F. *Developmental Biology* Sunderland, Mass.: Sinaver Associates Inc., 1985, at p. 61. Petitioner provides a helpful development of methylation. See, Loce pet. at 16 to 19.

Genetic fingerprinting establishes the uniqueness and identity of each person from the earliest stages of life after conception.[66]

The technologies of molecular biology have recently begun to be used to detect fetal abnormalities and to determine the fetus' sex by analyzing a very small number of fetal cells that have found their way into the mother's bloodstream (about 1 cell in 10 to 100 million blood cells of the mother).[67]

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[66] Jeffreys, et al. *DNA Fingerprints and Segregation Analysis of Multiple Markers in Human Pedigrees*, Am. Journal of Human Genetics, 39:11-24 (1986); Honma, M., et al. *Application of DNA Fingerprinting to Parentage and Extended Family Relationship Testing*, Human heredity, 1990, 40:p356-362; Jeffreys, A.J., et al., *Principles and Recent Advances of Human DNA Fingerprinting*; DNA Fingerprinting: Approaches and Applications, edited by Jeffreys (1991). Jeffreys, A.J.; Brookfield, J.F.Y; and Semeonoff, R. "Positive Identification of an Immigration Test-Case Using Human DNA Fingerprints." *Nature* 317 (1985):818-819, at pp. 818-819. Honma, M.; and Ishiyama, I. "Application of DNA Fingerprinting to Parentage and Extended Family Relationship Testing." *Hum Hered* 40(1990): 356-362, at p. 356. Kovacs, B.W.; Shahbahrami, B.; Medearis, A.L.; and Comings, D.E. "Prenatal Determinations of Paternity by Molecular Genetic "Fingerprinting." *Obstet Gynecol* 75(1990): 474-478, at pp. 474-475.

[67] Price, J.O.; Elias, S.; Wachtel, S.S.; Klinger, K.; Dockter, M.; Tharapel, A.; Schulman, L.P.; Phillips, O.P.; Meyers, C.M.; Schook, D.; and Simpson, J.L. "Prenatal Diagnosis with Fetal Cells Isolated From Maternal Blood by Multiparameter Flow

Using cell sorting technology (another post-*ROE* development) and DNA probe technology, scientists can now determine, for example, the presence of a growing boy or girl from a sample of four milliliters of the mother's blood.[68] It is a fact of human genetics and heredity that a specific person's cells all contain the same DNA composition (except for sperm and ovum cells)[69] so that *the few fetal cells that have found their way into the mother's bloodstream signify the presence of a unique human being existing separately in the mother's womb.*

The ability to detect genetic disorders before birth has improved dramatically during

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Cymetry" *Am J Obstet Gynecol* 165(1990): 1731-1737, at p. 1731.

[68] Price, J.O.; Elias, S.; Wachtel, S.S.; Klinger, K.; Dockter, M.; Tharapel, A.; Schulman, L.P.; Phillips, O.P.; Meyers, C.M.; Schook, D.; and Simpson, J.L. "Prenatal Diagnosis with Fetal Cells Isolated From Maternal Blood by Multiparameter Flow Cytometry" *Am J Obstet Gynecol* 165(1990): 1731-1737, at p. 1731.

[69] Oppenheimer, S.B.; and Lefeure, G. Jr. *Introduction to Embryonic Development* Allyn and Bacon 1989. (pp. 20-60) at p. 53. Papalia, D.E.; and Okls, S.W. *A Child's World: Infancy Through Adolescence.* New York: McGraw-Hill, Inc., 1979, at p. 51.

the last two decades.[70] The application of DNA techniques to prenatal diagnosis of single gene disorders first occurred in 1976.[71]

Another major advancement has been chorionic villus sampling. It was only in 1982 that its potential for use in determining genetic disorders was realized. Due to the fact that trophoblastic tissue has the same "genetic constitution" as the fetus, a sample from the chorionic villi reflects the chromosomal, biochemical and DNA status of the fetus. Therefore, the production of trophoblastic tissue is controlled by the DNA of the developing child and not by that of the mother. This procedure uses tissue collected in the first trimester of life.[72]

The techniques involved in "in vitro" fertilization demonstrate that the child is a

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[70] Hogge, W. A. "Chorionic Villus Sampling" In *The Unborn Patient* 2nd ed. edited by M.R. Harrison et al., 53-57. Philadelphia: W.B. Saunders Co., 1991, at p. 53.

[71] Boehm, C.D. and Kazazian, H.H. Jr., "Prenatal Diagnosis by DNA Analysis" In *The Unborn Patient* 2nd ed., edited by Michael R. Harrison et al., 82-91 at 82. Philadelphia: W.B. Saunders Company, (1991).

[72] Hogge, W.A. "Chorionic Villus Sampling" In *The Unborn Patient* 2nd ed. edited by M.R. Harrison et al., 53-57. Philadelphia: W.B. Saunders Co., 1991, at p. 53.

unique human being from conception. Before implantation, the new human being is clearly separate from its mother. During the period after fertilization and before implantation, it is possible to determine the sex of the child whose development began apart from both the mother and father.[73] The pre-implantation diagnosis of certain genetic diseases is also considered a feasible medical advance.[74] These procedures support the conclusion that the pre-implanted embryo is a genetically unique and complete human being.

The goals in the study of human embryo viability in synthetic culture medium are improved development and pregnancy success. Recently, an embryo derived platelet activating factor was discovered which, when added to growth media, dramatically increased the developmental potential of the embryo.[75]

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[73] Handyside, A.H.; Pattinson, J.K.; Penketh, R.J.A.; Delhanty, J.D.A.; Winston, R.M.L.; and Toddenham, E.G.D. 1989. "Biopsy of Human Preimplantation Embryos and Sexing by DNA Amplification." *Lancet* I (1989):347-349, at p. 348.

[74] Monk, M.; and Holding, C. "Amplification of a Beta-Haemoglobin Sequence in Individual Human Oocytes and Polar Bodies." *Lancet* 335(1990): 885-987, at 985.

[75] O'Neill, C. "A Consideration of the Factors Which Influence and Control the Viability and Developmental Potential of the Preimplantation

This chemical, produced by the new human, supports the conclusion that, even before implantation, there exists an independent, unique human being able to produce substances that enhance its own chances for survival.

The "fetus" is not "part of" a woman's body. If it were, the mother's body would control the child's genetic growth and development. Using modern molecular biology technology not available in the 1970's, it has been found that, by the third cell division after fertilization, control of growth and development has been established by the new human being's DNA.[76]

In 1981, the Subcommittee on Separation of Powers of the Judiciary Committee of the U.S. Senate conducted extensive hearings on the question of when life begins and, based on the scientific knowledge at that time, the committee concluded:

> Life of a human being begins at conception ... [T]oday the facts are beyond dispute ... physicians, biologists and other scientists argue that conception marks the beginning of

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Embryo." *Baillieres Clin Obstet Gynaecol* 5(1991): 159-178.

[76] Telford, N.A.; Watson, A.J.; and Schultz, G.A. "Transition From Maternal to Embryonic Control in Early Mammalian Development: A Comparison of Several Species." Molecular Reproduction and Development 26(1990): 90-100, at 92.

> the life of a human being ... [T]here is overwhelming agreement on this point in countless medical, biological, and scientific writings.[77]

There simply is no credible evidence to refute this conclusion.

II. BASED ON NEW SCIENTIFIC AND MEDICAL INFORMATION IT IS NOW KNOWN THAT A CHILD EXPERIENCES PAIN DURING ABORTION EVEN AS EARLY AS EIGHT WEEKS AFTER CONCEPTION.

Studies conducted using new technology have produced data supporting the conclusion that the unborn child is subjected to great pain during an abortion, and that the child experiences pain as early as eight weeks after conception.

A. The New Technology

Development of techniques of monoclonal antibody production, first described in 1975, using mouse material and then further developed to allow the production of specific human antibodies in the early 1980's[78], has

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[77] Report on Human life Bill, Subcommittee on Separation of Powers, Committee on the Judiciary United States Senate (97th Cong., 1st Sess. 1981) p. 7.

[78] Martinis, J.; David, G.S.; Bartholomew, R.M.; and Wang, R. "Novel Applications of Monoclonal Antibodies." In *Basic Biology of New Development* In *Biotechnology* In *Basic Life Sciences* 25(1983): 129-154, at pp. 129-130. Cole, S.C.P.; Campling, B.G.; Atlaw, T.; Kozbor, D.; Roder, J.C. "Human Monoclonal Antibodies." *Mol Cell Biochem* 62

complemented DNA and RNA studies (which are the subject of molecular biology) by allowing for the specific detection and location of individual proteins or peptides in a human cell sample.

The use of monoclonal antibody technology[79], as well as recent developments in modern protein chemistry and electrophysiology, are being applied to questions relevant to human developmental neurobiology. Initially applied in the mid 1980's, this technique was seen to have the potential to revolutionize the understanding of the human nervous system at its inception. Scientists recognized that with this technology they could investigate nervous system function and development at the molecular or chemical level and were no longer limited to observations of the histological presence of nerves and other gross functionality. From the start, this technological application showed that the classical histo-

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(1984): 109-120, at p. 109.

[79] Campbell, A.M. "Monoclonal Antibody Technology" In *Laboratory Techniques and Biochemistry and Molecular Biology*, edited by R.H. Burdon and P.H. Van Knippenberg. Eisevier (Amsterdam), 1985

logical and functional criteria for defining (nerve) cell types was oversimplified.[80]

One result was the detection of some 30 neuropeptides (or nerve hormones) directly involved in the functioning of the human nervous system. The presence of peptides (the hormones) of the endocrine system were known in 1973; but since then, similar substances have been found to be present in nerve fibers. This discovery was described in 1985 as revolutionary.[81] The neuropeptides function as neurotransmitters and neuromodulators which are located at axon terminals at synapses throughout human tissue. Two important neuropeptides are substance P (the chemical messenger of pain) and enkephalin (a neurotransmitter involved in pain perception).[82] The detection of these two neuropeptides in samples of human tissue has

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[80] Fischbach, G.D. "An Introduction to Molecular Approaches in Studies of Neuronal Development and Synapse Formation." In *Molecular Neurobiology* In *Neurology and Psychiatry*, edited by M.D. Erich, R. Kandel. New York: Raven Press, 1987.

[81] Ballesta, J.; Bloom, S.R.; and Polak, J.M. "Distribution and Localization of Regulatory Peptides." *Crit Rev Clin Lab Sci* 22(1985):185-218, at pp. 185-186.

[82] Clark, J., ed. *The Nervous System: Circuits of Communication. The Human Body.* Torstar Books, Inc., 1985, at pp. 152-154.

been used to define and locate nervous system development and function in the human being from the time of conception. In 1985, the study of neuropeptides was still in its infancy. Due to the accelerated pace of study, however, it disclosed a very complex process of interacting peptides, neurons, and ion channels which play an important role in the detection and transmission of sensation in the human. The discovery was a direct result of new immunocytochemical techniques used in conjunction with radioimmunoassay, neither of which techniques were available in the 1970's.

B. Assumptions About Pain.

Since *Roe v. Wade* there have been a number of formerly held assumptions about human neurological development and our ability to feel pain that have since been refuted. The first assumption was that neonates were incapable of feeling pain.[83] The second assumption was that myelinated nerve fibers were necessary for pain perception and that, since they did not form completely until after birth, pain perception was a late developmental event. The third assumption was that pain experience required pain detecting nerves

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[83] Porter, F. "Pain in a Newborn," *Neonatal Neurology, Clinics in Neonatology*, 16(2) p. 549 et seq. (1989).

connected to the thalamus and then to the brain cortex; there was presumed to be a period of cortical maturation necessary before pain could be experienced. All of these assumptions were based on gross histological observations. Those making such assumptions did not know about neuropeptides and they did not have available the modern methodologies and techniques developed in the last decade.

Only recently has it been understood that even neonates feel pain.[84] At the time of *Roe*, it had been assumed by the medical community that a fully developed and mature cortical brain region was necessary for pain perception. This assumption was inconsistent with the observations of those who cared for premature infants,[85] biochemical studies

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[84] Fitzgerald, M.; and McIntosh, N. "Pain and Analgesia in the Newborn." *Arch Dis Child* 64(1989): 441-443, at p. 441.

[85] One of whom stated eloquently: "It has generally been assumed that the ability of a child to feel pain increases with age and that neonates may not perceive pain or may perceive it only minimally. Assumed by whom? Certainly not by those of us at the bedside of critically ill infants, who see them flinch from procedures, startle in response to loud noises, and turn from bright lights and various other forms of stimulation. Not by those who have heard infants' anguished cries and seen their vigorous withdrawals from painful stimuli. Not by those who have observed their increased heart and respiratory

supported the observations of care givers concerning pain experiences.

Studies on unborn and premature infants show that pain is experienced much earlier in development than previously thought. Detailed hormonal studies in pre-term neonates undergoing surgery under minimal anesthesia have shown marked release of catecholamines, as well as autonomic nervous stimulation, heart rate changes, increased hormonal activity and increased motor activity, events consistent with stress resulting from pain.[86] It has been documented that endocrine and metabolic responses associated with pain are abolished by giving anesthesia to the pre-term neonate[87] and to the fetus.[88]

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rates and profuse sweating in response to heel sticks or circumcision. And finally, not by those who have seen babies gasp for every breath as they die from incurable lung disease."
Fletcher, A.B. "Pain in the Neonate." *N Eng J Med* 317(1987): 1347-1348, at p. 1347.

[86] Rosen, M.A., *Anesthesia for Procedures Involving the Fetus* (1991), Seminars in Perinatology 15:410-417.

[87] Scanlon, J.W.; "Appreciating Neonatal Pain." *Adv Pediatr* 38(1991): 317-333, at p. 320. Rosen, M.A. "Anesthesia for Procedures Involving the Fetus." *Semin Perinatol* 15(1991): 410-417, at p. 431.

C. The Need to Relieve Pain During Fetal Surgery.

Since 1981, the field of fetal surgery has made dramatic advances. It is now common practice during fetal surgery to monitor fetal vital signs and to give the fetus anesthesia.[88] "Although the mother is

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[88] Levine, A.H. (1991), Fetal Surgery, *Aorn J*, V54(1): 16-19, 22-27, 30-32, at p. 27. Rosen, M. "Anesthesia and Monitoring for Fetal Intervention" In *The Unborn Patient* 2nd ed., (1991), Harrison (editors), W.B. Saunders Co. p. 176, at p. 176. See Nathanson at 52a.

[89] Levine, A.H. "Fetal Surgery." *Aorn J*, 54(1991): 17-19, 22-27, 30-32, at p. 30. Harrison, M.R.; Adzick, N.S.; Longuker, M.T.; Goldberg, J.D.; Rosen, M.A.; Filly, R.H.; Evans, M.I.; and Golbos, M.S. "Successful Repair in Utero of a Fetal Diaphragmatic Hernia After Removal of Herniated Viscera from the Left Thorax." *N Eng J Med* 322(1990): 1582-1584, at p. 1582. Strickland, R.A.; Oliver, W.C.; Chantigian, R.C.; Ney, J.A.; and Davidson, G.K. "Anesthesia, Cardiopulmonary Bypass, and the Pregnant Patient." *Mayo Clin Proc* 66(1991): 411-429, at pp. 414-415. Longaker, M.T.; Golbus, M.S.; Filly, R.A.; Rosen, M.A.; Chang, S.W.; and Harrison, M.R. "Maternal Outcome After Open Fetal Surgery." *JAMA* 265(1991): 737-741, at p. 737. Harrison, M.R.; Golbus, M.S.; Filly, R.A.; Anderson, R.L.; Flake, A.W.; Rosen, M.; and Huff, R.W. "Fetal Hydronephrosis: Selection and Surgical Repair." *J Pediatr Surg* 22(1987): 556-558, at p. 556. Rosen, M. "Anesthesia and Monitoring for Fetal Intervention" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison 172-181. Philadelphia: W.B. Saunders Co., 1991, at p. 176; Strickland, supra, at 411.

anesthetized for fetal surgery, the fetus becomes the prime target for the anesthesia."[90] "For fetal surgery, unlike maternal surgery, the fetus is not an innocent bystander for whom we attempt the least anesthetic interference. Instead, the fetus is the primary patient, requiring safe administration of anesthesia and close monitoring of anesthetic effects to ensure well being."[91] Studies indicate that performing surgery on unanesthetized fetuses results in automic nervous system stimulation, increased hormonal activity, increased motor activity, and variations in heart rate.[92] Anesthesia is used in fetal surgery on children as young as 18 weeks gestation.[93]

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[90] Levine, A.H. "Fetal Surgery." *Aorn J*, 54(1991): 17-19, 22-27, 30-32, at p. 27. See also, Strickland, supra, at p. 411.

[91] Rosen, M. "Anesthesia and Monitoring for Fetal Intervention" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison 172-181. Philadelphia: W.B. Saunders Co., 1991, at p. 176.

[92] Levine, A.H. "Fetal Surgery." *Aorn J*, 54(1991): 17-19, 22-27, 30-32, at p. 27. Rosen, M. "Anesthesia and Monitoring for Fetal Intervention" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison 172-181. Philadelphia: W.B. Saunders Co., 1991, at p. 176.

[93] Harrison, M.; and Adzick, N.S. "The Fetus as a Patient." *Ann Sur* 213(1991): 279-291, at p. 281.

D. Non-Myelinated Nerve Fibers Transmit Pain.

Until recently, pain perception was presumed to require myelinated[94] nerve fibers[95] which are present only later in development. It has now been shown that this is not necessarily the case.[96] Both myelinated and non-myelinated nerve fibers transmit pain.[97] Most fibers of the nervous system of a newborn infant are not myelinated until two years after birth when the spinal cord, brainstem, and cerebellum are finally myelinated.[98] Myelin is not needed to conduct impulses over the non-myelinated fibers, although non-myelinated fibers conduct slower than mye-

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[94] Myelin is the fatty substance that makes up the sheath around many nerve fibers.

[95] Clark, J., ed. *The Nervous System: Circuits of Communication. The Human Body.* Torstar Books, Inc., 1985, at p. 153.

[96] Anand, K.J.S.; and Hickey, P.R. "Pain and Its Effects in the Human Neonate and Fetus." *N Engl J Med* 317(1987): 1321-1329, at p. 1322. Casey, K.L. "Neural Mechanisms of Pain: An Overview." *Acta Anaesthesiol Scand* Suppl 74(1982): 13-20, at 13.

[97] Anand, K.J.S.; and Hickey, P.R. "Pain and Its Effects in the Human Neonate and Fetus." *N Engl J Med* 317(1987): 1321-1329, at 1322.

[98] Clark, J., ed. "The Nervous System: Circuits of Communication." *The Human Body.* Torstar Books, Inc. (1985).

linated ones.[99] "Even when mature, most peripheral pain fibers are unmyelinated or, at best, thinly myelinated, lack of myelination therefore cannot be used as a valid argument to deny pain appreciation in the newborn."[100]

E. It is Now Known that Full Cortical Development Is Not Needed for a Child to Experience and Respond to Pain Prior to Birth.

Science no longer accepts that cortical involvement is necessary for pain detection.[101] Evidence to support the premise that pain can be experienced by children before 23 weeks gestation comes from the early detection of pain-associated chemicals; the timing of nerve development; the observation of fetal behavior and the study of full-term infants with anencephaly.

The discovery of neuropeptides and their function as nerve impulse transmitters and

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[99] Clark, J., ed. *The Nervous System: Circuits of Communication. The Human Body.* Torstar Books, Inc., 1985, p. 109.

[100] Scanlon, J.W.; "Appreciating Neonatal Pain." *Adv Pediatr* 38(1991): 317-333, at p. 320.

[101] Boreus, L.O. "Pain in the Newborn - Pharmacodynamic Aspects." Dev. Pharmacol Ther 15(1990): 142-148, at p. 144. See also discussion at p. 71-73.

modulators was totally unknown at the time of *Roe* and is recognized as revolutionary.[102]

In order to experience pain, there must be an event and the detection of the event outside the brain region. It is a very important recent observation that, using immunohistochemistry techniques, substance "P" positive neurons and nerve fibers were detected at 11 weeks post-fertilization, and enkephalin positive neurons and nerve fibers were detected at 13 weeks post-fertilization. Levels of substance "P" and enkephalin at 12 to 14 weeks were comparable to levels found in the full-term baby. In 1990, as a result of this revelation, researchers have stated that:

> [T]he importance of the early appearance of enkephalin and substance "P" neurons and fibers of the pain pathways in the major subnuclei connecting with the cardio-vascular, gastrointestinal and respiratory functions in the human has to be stressed.[103]

None of the significant techniques used in the cited study were available in 1973. Others

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[102] See the discussion of the role of neuropeptides in pain transmission found in the Loce pet. at 21 to 24.

[103] Yew, D.T., et. al. *Development and Localization of Enkephalin and Substance P in the Nucleus of the Tractus Solitarius in the Medulla Oblongata of Human Fetuses*, Neuroscience 34(1990) p.491-498, at p. 491.

have found substance "P" present at five weeks gestation and it has been detected at all stages of development from that point on.[104]

In the last seven years, science has examined the relationship between substance P and pain.[105] It has found that substance "P" (a neuropeptide), an important excitatory transmitter of pain pathways, is clearly present in the human at five weeks post fertilization.[106] Nervous system development and function occur well before 28 weeks gestation.

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[104] Tam, P.K.; and Lister, J. "Maldevelopment of Spinal Cord - Substance P in Spina Bifida." *Z Kinderchir* 41(1986): 206-208. Wadhwa, S.; Rizvi, T.A.; and Bijiani, V. "Substance P-Immunoreactivity in the Developing Human Retinogeniculate Pathway." *Neurosci Lett* 89(1988): 25-30, at p. 25. Paulin, C.; Charnay, Y.; Chayvialle, J.A.; Daniere, S.; and Dubois, P.M. "Ontogeny of Substance P in the Digestive Tract, Spinal Cord and Hypothalamus of the Human Fetus." *Regul Pept* 14(1986): 145-153, at p. 145.

[105] Uddman, R.; Edvinsson, L.; Jansen, I.; Stiernholm, P.; Jensen, K.; Olesen, J.; and Sunder, F. "Peptide-Containing Nerve Fibers in Human Extracranial Tissue: A Morphological Basis for Neuropeptide Involvement in Extracranial Pain?" *Pain* 27(1986): 391-399.

[106] Luo, C.B.; Zheng, D.R.; Guan, Y.L.; and Yew, D.T. "Localization of Substance P and Enkephalin by Immuno histochemistry in the Spinal Cord of the Human Fetus." *Neuroscience* 27(1988): 989-993, at p. 989.

If a neocortex is needed for pain detection, then the fact that neocortex development begins at eight weeks gestation and the fetus has all its neurons by 20 weeks is pertinent.[107] Some may assume that a degree of cortical maturity is necessary for pain perception. That assumption led physicians to assume, at the time *Roe* was decided, that newborns did not feel pain. Clearly, that assumption was wrong.

Until recently, science was incapable of answering questions about the role of chemicals in the transmission of pain. In fact, science had not even discovered the existence of most of the key chemicals at the time *Roe* was decided. Absent knowledge about pain transmitting chemicals, it was thought that a physical structure such as dendritic spines was necessary to "determine" when pain transmission was possible. The presence of pain transmitting chemicals before the presence of such physical structures makes pain transmission possible at an earlier gestational time. A recent review summarized the current state of understanding of the

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[107] Marin-Padilla, M. "Structural Organization of the Human Cerebral Cortex Prior to the Appearance of the Cortical Plate." *Anat Embryol* 166(1983): 21-40, at p. 21.

function and development of the brain in the developing human.[108]

Using modern techniques to identify different types of nerve synapses as well as different types of neurotransmitters in samples taken from 8 to 37 week old fetuses,[109] it was concluded that the morphological substrate for nociception (pain detection) in the spinal cord exists at very early stages of development. As early as the end of the first trimester, the thalamus, third ventricle, midbrain, brain stem and cerebellar hemispheres are developed and their appearances, besides physical size, go unchanged throughout the rest of fetal

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[108] Lagercrantz, H.; and Forssberg, H. "Functional Development of the Brain in the Fetus and the Infant." *Lakartidningen*(1991): "Neuronal multiplication occurs mainly from the tenth to twentieth gestational weeks, after which no new nerve cells are formed, though neuronal arborization and the information and reorganization of synapses continues until adulthood ...Somatosensory functions are developed at an early stage. The pain threshhold is assumed to be lower in the fetus than in the adult. In man general fetal movements appear from the eighth gestational week and more complex movements such as sucking, swallowing and breathing during the tenth to twelfth gestational weeks. These movements are generated by neuronal networks." *Id.* at 1880-5.

[109] Rizvi, T.; Wadhwa, S.; and Bijiani, V. "Development of Spinal Substrate for Nociception" *Pain 4(1987-suppl.): S195.*

development.[110] Nature in its wisdom prepares the nervous system first so that all other systems can develop and function as they should.[111] This is logical since pain detection and response to pain are important to the human's ability to survive.

It was also recently discovered that many behaviors characteristic of newborns are also

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[110] Filly, R.A. "Sonographic Anatomy of the Noraml Fetus" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison et al., 92-130, Philadelphia: W.B. Saunders Co., 1991, at p. 122. Others have also observed many of the important parts of the puzzle early in development. At seven weeks gestation, cutaneous sensory receptors appear in the fetus. This is preceded by the development of synapses or junctions between sensory nerve fibers and interneurons of the spinal cord. Anand, K.J.S.; and Hickey, P.R. "Pain and Its Effects in the Human Neonate and Fetus." *N Engl J Med* 317(1987): 1321-1329, at p. 1322. A basic sensory response loop is present very early in human development. It is noteworthy that, with ultrasound, we can observe movement by the fetus away from outside stimulation by the eighth week. Flower, M.J. "Neuromaturation of the Human Fetus." *J Med Philos* 10(1988): 237-351. Brain activity, as detected by electroencephalography, is also present at 8 weeks gestation. Goldenring, J.M. "Development of the Fetal Brain." *N Engl J Med* 307(1982): 564, at p. 564; Flower, M.J., *supra*.

[111] Kalvger, G.; and Kalvger, M.F. Human Development: *The Span of Life*. St. Louis: The C.V. Mosby Company, 1974, at p. 35.

found in anencephalic children[112] (children born without a developed cortex[113]). Such behaviors were formerly erroneously ascribed to cerebral hemispheric activity.[117]

During their brief post-birth lives[118] these children breath spontaneously and have a grasp response.[119] They respond to noxious stimuli known to cause pain by avoidance, withdrawal and by crying.[120] They breath,

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[112]The Medical Task Force on Anencephaly, (Stumpf, D.A., et al.) "The Infant with Anencephaly" *N Eng J Med* 322(1990): 669-674.

[113]Shewmon, D.A.; Capron, A.M.; Peacock, W.J.; and Schulman, B.L. "The Use of Anencephalic Infants as Organ Sources: A Critique." *JAMA* 261(1989): 1773-1781.

[117] *Id.*

[118] Anencephalic children have a post-birth life expectancy of a few hours to a few months.

[119] Ashwal, S.; Peabody, J.L.; Schneider, S.; Tomasi, L.G.; Emery, J.R.; and Peckham, N. "Anencephaly: Clinical Determination of Brian Death and Neuropathologic Studies." *Pediatr Neurol* 6(1990): 233-239.

[120] Stumpf, D.A., Chair of Medical Task Force on Anencephaly. "The Infant With Anencephaly." *N Eng J Med* 322(1990): 669-674. Shewman, D.A.; Capron, A.M.; Peacock, W.J.; and Schulman, B.L. "The Use of Anencephalic Infants as Organ Sources: A Critique." *JAMA* 261(1989): 1773-1781. Van Assche, F.A. "Anencephalics as Organ Donors." *Am J Obstet Gynecol* 163(1990): 599-600. Ashwal, S.; Peabody, J.L.; Schneider, S.; Tomasi, L.G.; Emery, J.R.; and

cough, hiccup, smile, grimace, yawn and suck.

In a recent study of twelve anencephalic infants, all responded to pain, all had an exaggerated sustained response to touch, all evinced spontaneous movement, and all breathed spontaneously.[121] Additionally, seven of the twelve responded toward stimulation at their mouths (rooting response) and seven had a sucking response.[122] Spontaneous movement in the fetus begins between 6 and 7 1/2 weeks gestation.[123] Stimulation of the mouth area resulting in a response towards the stimulus is seen in the child at 9 weeks gestation and sucking is present at 11 weeks gestation.[124] Based on this study, one can conclude that the

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Peckham, N. "Anencephaly: Clinical Determination of Brain Death and Neuropathologic Studies." *Pediatr Neurol* 6(1990): 233-239.

[121] Ashwal, S.; Peabody, J.L.; Schneider, S.; Tomasi, L.G.; Emery, J.R.; and Peckham, N. "Anencephaly: Clinical Determination of Brain Death and Neuropathologic Studies." *Pediatr Neurol* 6(1990): 233-239.

[122] *Id.*

[123] de Vries, J.I.P.; Visser, G.H.A.; and Prechtl, H.F.R. "The Emergence of Fetal Behavior. I. Qualitative Aspects." *Early Hum Dev* 7(1982): 301-322. Flower, M.J. "Neomaturation of the Human Fetus." *J Med & Phil* 10(1985): 237-251.

[124] Flower, M.J. "Neomaturation of the Human Fetus." *J Med & Phil* 10(1985): 237-251.

fetus at 6 to 11 weeks gestation is neurologically developed to a point at least equivalent to the twelve anencephalic children described above; in other words, they are all capable of experiencing pain.

The recent biochemical evidence unavailable in 1973, supports the finding that, at very early stages of fetal development, the fetus experiences pain. This evidence is consistent with observed fetal behavior (using real time ultrasound) which shows the fetus moving away from painful stimuli at 8 weeks gestation, the same behavior observed in full-term anencephalic infants. Modern instruments pick up brain wave activity, also at 8 weeks gestation. Together, these observations point to an active sensory system present and functioning in the fetus at 8 weeks gestation, which allows the unborn child to feel pain.

CONCLUSION

There is a scientific consensus, based on recent scientific advances, that a unique human life begins at conception, that pain is experienced as early as eight weeks gestation and that abortion results in the painful death of a unique and irreplaceable human being.

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